



The increasing trend of the duration of stratospheric sudden warming in the Northern Hemisphere related to the warming of eastern tropical sea surface temperature

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The stratospheric sudden warming (SSW) is an important manifestation of stratospheric tropospheric coupling. Studying the trend of SSW in the past decades of climate change is useful for assessing changes in the SSW under future climate change. Using the NCEP reanalysis data, the trends of SSW in the Northern Hemisphere during the winter (from December to February) of 1948 to 2017 were analyzed. The duration of winter SSW in the Northern Hemisphere was found to increase at a rate of 2.0 days/decrease. At the same time, an El Niño-like Warming of tropical sea surface temperature (SST) are detected using only bucket measurements from the International Comprehensive Ocean–Atmosphere Data Set17 (ICOADS). The El Niño-like Warming of tropical SST resulted in continuous enhancement of convection in eastern Pacific area. Teleconnections such as western Pacific teleconnection (WP) and Pacific-North America teleconnection (PNA) related to the convection have therefore had a positive trend over the past 70 years. Then the upward propagation of planetary wave was enhanced, caused the duration of SSW became longer.